UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/765,857	01/18/2001	Michael J. Rodriguez	CS10968	1168

7590   08/03/2004

Motorola, Inc.
Intellectual Property Dept. (BMM)
600 North US Highway 45, AN475
Libertyville, IL 60048

EXAMINER
MUNOZ, GUILLERMO

ART UNIT	PAPER NUMBER
2637	3

DATE MAILED: 08/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/765,857	RODRIGUEZ, MICHAEL J.
	Examiner	**Art Unit**
	Guillermo Munoz	2637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2001*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1,2,4,9 and 10* is/are allowed.

6)☒ Claim(s) *3,5-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 5 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Sindhushayana.

Regarding claim 5, Sindhushayana teach a simplified method for deriving the LLR metrics based upon estimation rather than direct computation which teaches all the claimed subject matter "providing a set of eight possible Gray-coded symbols…repeating steps a) through h) until all symbols to be input are decoded" in claim 5 as follows. Sindhushayana teach the set of eight possible Gray-coded symbols in Col. 6, lines 12-13 and Fig. 12. Sindhuhayana teach the signal constellation with 2^m points located on the unit circle, note Col. 20, lines 65-67 and Fig. 12, thus defining the radial boundary for all symbols of the constellation. Sinduhayana teach plotting the location of the symbol using complex coordinates, note equation 15 on Col. 21, line 5. Sindhushayana does not explicitly teach "locating the two nearest constellation points to the symbol having a 0 value and a 1 value, however, the functionality of finding the probability of $b_k=0$ and finding the probability of $b_k=1$ in equation 23 on Col. 23, line 43 is the same. Sinduhayana teach outputting LLR computations to a turbo decoder, note elements 412 and 414

of Fig. 8. Sinduhayanan teach repeating the iterative decoding until the soft data closely

represents the transmitted data, note Col. 2, lines 56-58.

Regarding claim 6, Sindhushayana teach the claimed subject matter by the inherency of

an 8-PSK constellation located on a unit circle and having an equal phase distance between each

point in the constellation, note Fig. 12.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sindhushayana in

view of Ling.

Sindhushayana disclose a carrier signal-to-interference ration based on a received pilot

signal is provided to the LLR Circuit, however, Sindhushayana does not explicitly state scaling

the LLC based on channel conditions.

Ling teach a Pilot Assisted Turbo Decoder having the LLC scaled by an expression based

on the pilot to noise ratio and signal SNR, note page 300 and equation 10.

Therefore, it would have been obvious to one having ordinary skill in the art at the time

of the invention to modify Sindhushaynana's LLC circuit with Ling's teaching of scaling the

LLC, since Ling suggest in page 301, sec. 5 that scaling the decoding metrics is extremely

important for Turbo decoders.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 recites the limitation "the filtered pilot signal" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 3 recites the limitation "the filtered pilot signal" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claims 1, 2, 4, and 10 are considered allowable because the present invention comprises a method of log-likelihood ratio processing including the step of determining a single function for a soft-decision metric for each bit in a symbol by restricting the set of all possible Gray-coded constellation points to those closest to a boundary between a bit value of 0 and 1 for each bit in the input symbol and applying predetermined function corresponding to the range of restricted constellation points to the entire possible range of symbols. The closes prior art, Sindhushayana (US Patent Number 6,594,318 B1) shows a similar circuit including a modified LLC generator. However, Sindhushayana fails to teach determining a single function for a soft-decision metric for each bit in a symbol by restricting the set of all possible Gray-coded constellation points to those closest to a boundary between a bit value of 0 and 1 for each bit in

the input symbol. This distinct feature has been included in independent claim 1 rendering it allowable.

Claim 9 is considered allowable because the present invention comprises a method of log-likelihood ratio processing including the step of setting a soft-decision metric of the third bit of the symbol equal to $(|x|-|y|)2^{-1}$. The closes prior art, Sindhushayana (US Patent Number 6,594,318 B1) shows a similar circuit including a modified LLC generator. However, Sindhushayana fails to teach setting a soft-decision metric of the third bit of the symbol equal to $(|x|-|y|)2^{-1}$. This distinct feature has been included in independent claim 9 rendering it allowable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Munoz whose telephone number is 703-305-4224. The examiner can normally be reached on Monday-Friday 8:30a.m-4:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 703-308-7728. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GM
July 20, 2004

JEAN B. CORRIELUS
PRIMARY EXAMINER
7/22/04